·LIGHTING DESIGN·ELECTRICAL·SMART CITIES·
ENERGY REDUCTION·LIGHTING IMPACT

LUX SURVEY METHOD STATEMENT

PROJECT: FASTRACK BUS NETWORK EXPANSION (BEAN TUNNEL)

PREPARED FOR: KENT COUNTY COUNCIL

JULY 2024

PROJECT NUMBER: 1551			DOCUMENT REF: 1551-DFL-ELG-XX-SU-EO-13001			
S3	P05	Updated based on Arcadis Comments	DS	RC	RC	12/07/2024
S3	P04	Fourth Issue	DS	TP	RC	27/07/2022
S3	P03	Third Issue	DS	TP	RC	12/07/2022
S3	P02	Second Issue	DS	TP	RC	12/07/2022
S3	P01	First Issue	DS	TP	RC	27/05/2022
Suitability	**Revision**	**Purpose Description**	**Originated**	**Checked**	**Approved**	**Date**

Designs for Lighting Ltd
17 City Business Centre, Hyde Street, Winchester, SO23 7TA

T: +44(0)1962 855080, E: info@dfl-uk.com www.dfl-uk.com

Contents

1. Introduction 3
1.1 General 3
2. Contact Details 4
3. Personal Protective Equipment 4
4. Measuring Instruments 5
5. Methodology 6
5.2 Marking Out 6
5.3 Survey Area 6
5.4 On Site Survey – Marking Out 28th July 2022 Commencing at 22:00 7
5.5 On Site Survey – Night Time Phase – 28th July 2022 Commencing at 23:08 7
5.6 Climatic Conditions 8
5.7 Extraneous Light 8
5.8 Obstruction of Light 8
5.9 Requirements for DfL Personnel Undertaking On-Site Photometric Measurements 9
5.10 COVID Secure Working 9
Appendix 1 – Minolta T-10 Certification Certificate 10
Appendix 2 – Proposed Baseline Illuminance Survey Locations 12

1. Introduction

1.1 General

1.1.1 This Method Statement is provided by Designs for Lighting Ltd, a specialist lighting design consultancy with experience and knowledge in lighting impact assessments, mitigation and lighting surveys.

1.1.2 The purposes of the Lux Survey is to establish the existing levels of illuminance found in the area surrounding the planned tunnel, and to establish the requirements for the protection of photosensitive species.

1.1.3 The Method Statement proposes good practice and outlines a suitable approach to apply to the undertaking of photometric light assessments during the Lux Survey for Fastrack Bus Network Expansion (Bean Tunnels) taking place on the 28th of July 2022. The aim of the Method Statement is to outline a safe method of working to determine the existing levels of light at the entrance to the proposed tunnel and the adjacent areas of the chalk cliff.

1.1.4 This Method Statement will establish conventions, procedures, and acceptable levels of uncertainty applicable to taking practical light measurements of lighting installations and to allow the measurements to be used to establish baseline lighting conditions found at the Approved Site (Bluewater Shopping Centre, Dartford, Kent, UK)

1.1.5 The Approved Site is shown in **Figure 1**.

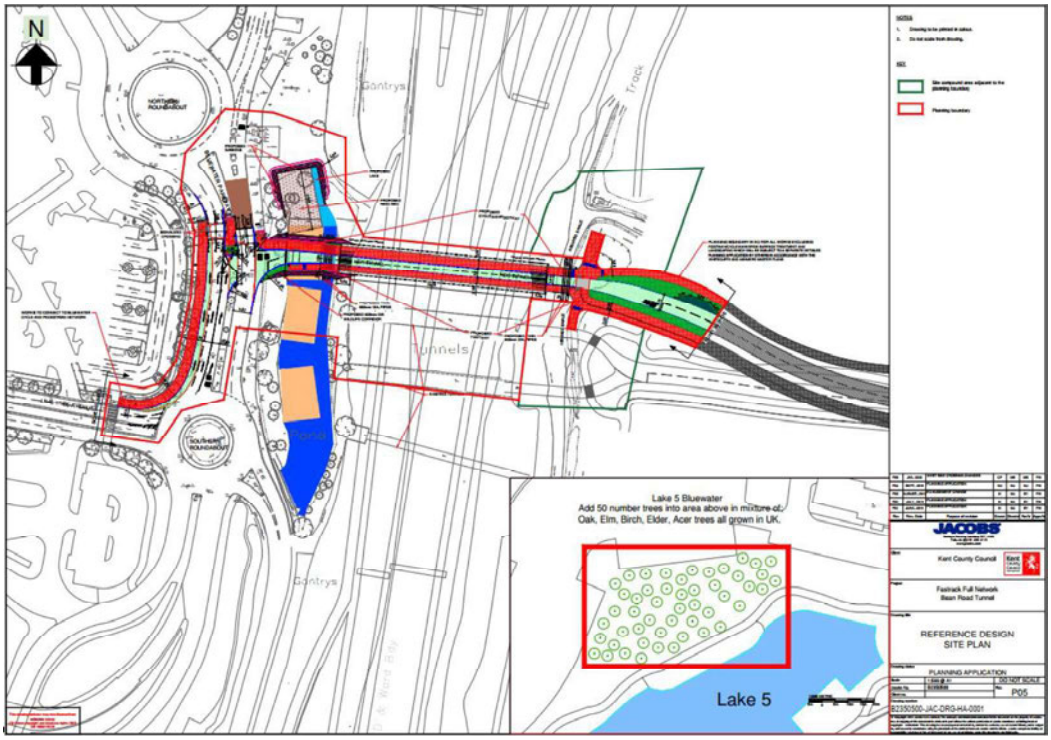

Figure 1: The Approved Site

Designs for Lighting
Light Assessment Methodology

2. Contact Details

Company	Role	Name	Contact Details
Designs for Lighting	Site Surveyor (1)	Daniel Spreadborough	Lighting Engineer T: +44 (0)1962 855 080 [redacted] E: daniel@dfl-uk.com mailto:ryan@dlf-uk.com
Designs for Lighting	Site Surveyor (2)	Toby Penter	Lighting Engineer T: +44 (0)1962 855 080 [redacted] E: toby@dfl-uk.com
Designs for Lighting	Off Site Contact	Ryan Carroll	Principle Engineer T: +44 (0)1962 855 080 [redacted] E: ryan@dfl-uk.con
	Site Contact (1)	Lloyd Holliday	Senior Project Manager, Balfour Beatty [redacted]

3. Personal Protective Equipment

3.1.1 The following PPE is to be worn at all times by each person undertaking the site survey;

- Safety Boots with toecap and midsole penetration protection;
- HI-Vis Jacket and Trousers;
- Protective Headgear;
- Long sleeve shirt; and
- Long Trousers (e.g. Jeans, Cargo Trousers, Electricians Trousers)

3.1.2 Each Site Surveyor is to keep the following on their person at all times;

- Mobile Phone
- Torch
- First Aid Kit

4. Measuring Instruments

4.1.1 Illuminance measurements will be recorded using a Konica Minolta T-10. It can be confirmed that the meter is;

- Suitable for the purpose;
- Complies with the appropriate British Standards;
- Its calibration certificate is in date and in accordance with the manufacturer's recommendations (**Appendix 1**);
- Reliable with proven repeatability of measurement; and
- Capable of direct measurements without the need for application of correction factors.

4.1.2 Photography will be recorded using a NIKON D3100 DLSR camera with a camera stand. The camera will have fully adjustable exposure times, f.stop (Aperture), and use a 18-55mm adjustable lens. The parameters of each photograph will be recorded and the photograph locations will be record using a GPS device.

5. Methodology

5.1.1 The baseline survey will be conducted in line with Institution of Lighting Professional (ILP) PLG04.2013 and ILP GN08.2018.

5.1.2 A risk assessment has been conducted to assess the inherent risks associated with the work outlined in this Method Statement, please see separate file: *1551-DFL-HLG-XX-RA-EO-13001*.

5.2 Marking Out

5.2.1 To ensure accuracy in marking out the grid points the following methodology will be used.

5.2.2 Survey points have been determined during a desktop study using the light spill modelling conducted during the design stage.

5.2.3 The survey shall be limited to the following;

- Survey track parallel to the existing ponds adjacent to the tunnel entrance; and
- Survey track running perpendicular to the tunnel entrance adjacent to the existing ponds to the north.

5.2.4 This area has been chosen based on the proposed illuminance survey location depicted in **Appendix 2**.

5.2.5 These positions shall be used to interpolate the lighting levels at the cliff face. Access to the cliff face itself is not possible due to risk associated with loose rock.

5.3 Survey Area

5.3.1 The baseline survey will be conducted within the area detailed below (**Figure 2**):

Figure 2: Baseline Survey Area (Survey Area is Highlighted in Yellow. Paths to be 1.0m wide.)

5.4 On Site Survey – Marking Out 28th July 2022 Commencing at 22:00

- Site Contact to be contacted via phone call before start of visit to determine meeting location and start time.
- Off Site Contact to be contact via SMS message at beginning of survey.
- Determine safe access route to survey positions with guidance from Site Contact.
- Additional risks to be recorded during daytime survey, and action taken / reported where required.
- Measurement positions to be marked out using measuring wheel, non-permanent survey paint, and survey flags as appropriate under the supervision of the Site Contact.
- Photography locations to be decided upon and recorded using GPS device. Daytime photography recorded along with notes on direction and lens focal length for replication during night time visit.

5.5 On Site Survey – Night Time Phase – 28th July 2022 Commencing at 22:32

- Site Contact to be contacted via phone call before start of visit to determine meeting location and start time.
- Follow safe access route determined during daytime survey to access areas that have been marked out for measuring.
- Light level readings to be taken at previously marked survey positions using Konica Minolta T10 under the supervision of the Site Contact.
- Off Site Contact to be contacted via text at end of night-time phase.

5.5.1 The Konica Minolta T10 will be placed horizontally directly over the measurement point on the surface to be measured and levelled carefully, to ensure consistency and accuracy in the light measurements taken at each location. Where vertical illuminance readings are taken the height of the measurement point will be approximately 1.5m and 4m from ground level with measurements record facing North, East, South, and West.

5.5.2 The night time phase of the survey will be complete no later than 03:00 on the 29th July 2022.

5.6 Climatic Conditions

5.6.1 When measuring light, the climatic conditions will be considered to ensure they do not unduly affect the performance of the installation. Readings will be taken in fine clear weather with little or no wind. Items to be considered include:

- High or low temperatures which may affect the light output of the luminaire and the accuracy of the measuring instrument.
- Condensation which may form on the light transmitting surfaces of the measuring instrument or its electronic circuits.
- High wind speeds or gusting winds which will cause the luminaires to oscillate.
- High levels of dust of moisture in the atmosphere, which will reduce the light transmission of the atmosphere
- Snow, fog, heavy rain, or mist/ haze which will reduce the light transmission of the atmosphere.

5.6.2 Weather conditions on 28th July 2022, at the time of writing, are predicted to be;

- Temperature Range: 13° - 22°
- Cloud Cover: Mostly Cloudy
- Precipitation: 10%
- Wind Speed: 5 - 12 mph
- Moon Phase: New Moon (0% visible)

5.6.3 Weather will be assessed prior to the survey taking place, and any changes in conditions will be noted.

5.7 Extraneous Light

5.7.1 As the purpose of the survey is to record a clear baseline of the survey area all permanently installed light sources will be taken into account during the survey.

5.7.2 Any passing light sources, included those from motor traffic, cyclists, or pedestrians, will be avoided where possible.

5.7.3 Any construction lighting will be assessed for its impact on the survey results and instruments will be shielded if required. If shielding causes a reduction in readings deem to be leading to anomalous results, an assessment on using unshielded readings will be made.

5.7.4 All measurements that are potentially affected by shielding or construction lighting will be recorded.

5.8 Obstruction of Light

5.8.1 As light measurements are being taken to establish the baseline light level found at the Application site, the readings will be taken in areas where the light is not obstructed by trees, vegetation, parked vehicles or highway furniture. Where there are obstructions that have a significant impact on the measurement points these will be recorded, and if possible, an alternative location will be found that does not suffer from any obstructions.

5.9 Requirements for DfL Personnel Undertaking On-Site Photometric Measurements

5.9.1 When working on-site, DfL personnel always prioritise their safety, that of their colleagues and the general public, such as motorists, pedestrians and cyclists. They are competent in their tasks and the requirements of such work assured by the appropriate National Highways Sector Scheme for Quality Management in Highway Works (in this case NHSS 8). Further to this, all DfL personnel are registered as approved personnel under the Highway Electrical Registration Scheme for the registration of Authorised Persons. This requires those involved in such measurements to meet the competency requirements defined within the relevant Competency and Occupations Matrix called up in the accompanying Highway Electrical Industry Scheme Handbook, specifically, but without limitation, Found01 Basic Health & Safety (ECS Highway Electrical Version H&S Test), Test04 Photometric performance testing. These cover general site safety awareness, use of PPE and the correct use of photometric instruments being used.

5.9.2 DfL understands its legal obligation to ensure that a risk assessment is undertaken prior to the survey to ensure that the general hazards and risks are identified and recorded. In the first instance, a desktop risk assessment has been completed and communicated with the personnel conducting the site survey work. Prior to DfL personnel commencing site survey works, a separate on-site risk assessment will be undertaken and appropriately recorded to ensure that site specific hazards and risks are taken into account. Where necessary, additional precautions will be enforced depending on the findings of the site-based risk assessment.

5.9.3 DfL personnel always prioritise their safety, that of their colleagues and the general public, such as motorists, pedestrians and cyclists. They are competent in their tasks and the requirements of such work.

5.9.4 Due to the nature of this work, it has been determined that lone working is not appropriate given the conditions on site including uneven and potentially waterlogged ground, and the potential hazard from falling rocks. As such, two DFL operatives will attend site and will be supervised by a representative who is familiar with the survey area.

5.10 COVID Secure Working

5.10.1 Face covering to be worn in line with government guidelines and / or contractor guidance.

5.10.2 DFL Operatives and on-site contacts to keep at least 2m distance unless safety requirements dictate otherwise. It will not be possible for the DFL Operatives to keep a maximum 2m distance to complete their work, and this is not required between them.

5.10.3 All paperwork will be filled in using the individuals own pen.

5.10.4 Operatives will carry hand sanitiser for frequent hand cleaning whilst on site.

5.10.5 If any member of the survey team development COVID-19 symptoms (high temperature or persistent cough) the survey is to be aborted, and different DFL operatives will return to continue the survey at a later date.

Appendix 1 – Minolta T-10 Certification Certificate

CERTIFICATE OF CALIBRATION

Issued By Inmar Automation Ltd
Date of Issue 28 July 2021

Certificate Number LB211703

Inmar Instrument Solutions

Test House
118 Ringwood Road
Totton
Southampton
SO40 8DS

Approved Signatory

L.J. Simpson ☑ N.A. Whiting ☐

Customer : DESIGNS FOR LIGHTING LTD
UNIT 17 CITY BUSINESS CENTRE, WINCHESTER
HYDE STREET, HAMPSHIRE SO23 7TA

Date Received : 22 July 2021

Instrument :

System ID :	id10799	Job Number :	23636-1
Description :	Lux Meter		
Manufacturer :	Minolta		
Model Number :	T-10		
Serial Number :	55611050		
Procedure Version	100-1000LUX		

Environmental Conditions

Temperature :	20°C ± 5°C	Mains Voltage :	230V ± 10V
Relative Humidity :	50%RH ± 10%RH	Mains Frequency :	50Hz ± 2Hz

Comments

Insrument was calibrated against laboratory standards which are traceable to National Standards

Results relate to time of test and do not carry any implications as to the long term stability of the instrument

Traceability Information

Instrument Description	*Serial Number*	*Certificate Number*	*Cal. Date*	*Cal. Period*
SCLAB Product Calibrator	PK27	VO330	08/07/2020	104

Calibrated By : M Chase [redacted] **Date of Calibration : 28 July 2021**

This certificate provides traceability of measurement to recognised National standards, and to the units of measurements realised at the National Physical Laboratory or other recognised National standards laboratories. Copyright of this certificate is owned by the issuing laboratory and may not be reproduced except with the prior written approval of the issuing laboratory.

This certificate complies with the requirements of BS EN ISO 10012:2003.

CERTIFICATE OF CALIBRATION

Certificate Number
LB211703

AS FOUND RESULTS

Test Title	Tolerance	Applied Value	Reading	Pass / Fail
Complete	---	---	Pass	PASS
Free from damage	---	---	Pass	PASS
Operational	---	---	Pass	PASS

CALIBRATION TEST RESULTS

Test 1	5Lux	100.0Lux	98.9Lux	PASS
Test 2	25Lux	500.0Lux	494.0Lux	PASS
Test 3	50Lux	1000.0Lux	985.0Lux	PASS

End of Results

END OF TEST DATA

Uncertainties

Appendix 2 – Proposed Baseline Illuminance Survey Locations

Baseline Survey Measurement Point (Ground Level, 1.5m, 3.0m)